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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/453,319 12/02/99 SHEPARD

S 64631-0020  
EXAMINER

010291 MMC2/0914  
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SUITE 140  
BLOOMFIELD HILLS MI 48304-0610

ART UNIT 1711 PAPER NUMBER

DATE MAILED:

09/14/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

<b>Office Action Summary</b>	Application No. <b>09/453,319</b>	Applicant(s) <b>Shepard</b>
	Examiner <b>Gail Verbitsky</b>	Art Unit <b>2859</b>
<i>-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --</i>		
<b>Period for Reply</b> <p>A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.</p> <ul style="list-style-type: none"> <li>- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.</li> <li>- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.</li> <li>- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.</li> <li>- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).</li> <li>- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).</li> </ul>		
<b>Status</b> <p>1) <input checked="" type="checkbox"/> Responsive to communication(s) filed on <u>Jul 19, 2001</u></p> <p>2a) <input type="checkbox"/> This action is FINAL.      2b) <input checked="" type="checkbox"/> This action is non-final.</p> <p>3) <input type="checkbox"/> Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under <i>Ex parte Quayle</i> 1035 C.D. 11; 453 O.G. 213.</p>		
<b>Disposition of Claims</b> <p>4) <input checked="" type="checkbox"/> Claim(s) <u>1-28</u> is/are pending in the application.</p> <p>4a) Of the above, claim(s) _____ is/are withdrawn from consideration.</p> <p>5) <input type="checkbox"/> Claim(s) _____ is/are allowed.</p> <p>6) <input checked="" type="checkbox"/> Claim(s) <u>1-6, 15, 16, and 18-28</u> is/are rejected.</p> <p>7) <input checked="" type="checkbox"/> Claim(s) <u>7-14 and 17</u> is/are objected to.</p> <p>8) <input type="checkbox"/> Claims _____ are subject to restriction and/or election requirement.</p>		
<b>Application Papers</b> <p>9) <input type="checkbox"/> The specification is objected to by the Examiner.</p> <p>10) <input type="checkbox"/> The drawing(s) filed on _____ is/are objected to by the Examiner.</p> <p>11) <input type="checkbox"/> The proposed drawing correction filed on _____ is: a) <input type="checkbox"/> approved b) <input type="checkbox"/> disapproved.</p> <p>12) <input type="checkbox"/> The oath or declaration is objected to by the Examiner.</p>		
<b>Priority under 35 U.S.C. §119</b> <p>13) <input type="checkbox"/> Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).</p> <p>a) <input type="checkbox"/> All b) <input type="checkbox"/> Some* c) <input type="checkbox"/> None of:</p> <ol style="list-style-type: none"> <li>1. <input type="checkbox"/> Certified copies of the priority documents have been received.</li> <li>2. <input type="checkbox"/> Certified copies of the priority documents have been received in Application No. _____.</li> <li>3. <input type="checkbox"/> Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).</li> </ol> <p>*See the attached detailed Office action for a list of the certified copies not received.</p> <p>14) <input type="checkbox"/> Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).</p>		
<b>Attachment(s)</b> <p>15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)      18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____</p> <p>16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)      19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)</p> <p>17) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____      20) <input type="checkbox"/> Other: _____</p>		

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## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devitt et al. 5111048 [hereinafter Devitt] in view of Li.

Devitt discloses in Fig. 1 a device and method of applying a stress to a sample/ specimen already having a crack or subsurface defect so that the crack becomes detectable (col. 7, lines 28-46).

Although Devitt does not specify that the crack was caused by heating a sample (specimen), i.e., thermal crack/ fatigue/ defect, it is very well known in the art that a crack can be caused by heating a sample (specimen). (See for example, Li who states that disbond/ defect can be caused by a heat). Inherently, there should be a source of heat to cause the crack.

Devitt does not disclose a thermal imager.

Cramer discloses a device comprising a thermal imager (infrared radiometer) 30 recording a plurality (first and second) of thermal images per unit area over time (col. 9, lines 56-57). Cramer also discloses a constant surface temperature heater 10. A material defect produces

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deviation from the constant surface temperature. The imager generates a video image of thermal characteristics of the test surface of a specimen.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the thermal imager in the device disclosed by Devitt with the thermal video imager, as taught by Cramer, so as to generate a video information of the thermal characteristics of the specimen, as already suggested by Cramer, in order to evaluate the dimensions of the defect.

3. Claims 2, 4-6, 15-16, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devitt, Li and Cramer as applied to claims 1, 3, 18 above, and further in view of Rose and Cielo et al. [hereinafter Cielo].

Devitt, Li and Cramer disclose the device as stated above in paragraph 2.

They do not specifically disclose applying decreased air pressure/ force/ stress onto a specimen as stated in claim 2 and other limitations of claims 4-6, 15-16 and 23.

Rose discloses a device comprising a sample 2, a heat source (laser) providing heating of the sample with a pulsed beam. The sample is mounted on a base block 16 which with a gas cell 20 mounted onto a surface A of the specimen form a gas tight chamber (sealed enclosure) 24 containing the specimen and having a sealed transparent window to allow radiation in. A microphone 22 is mounted in the housing to sense acoustic waves generated by change in gas

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pressure within the chamber (the numeral A has been added by the Examiner, see attachment to the Office action).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to place the specimen disclosed by Devitt, Li and Cramer in a sealed chamber with a window, as taught by Rose, in order to be able to regulate the pressure (change stress/ force applied to the specimen) in the chamber, as already suggested by Rose and very well known in the art.

Although Rose discloses changing pressure in the chamber, Rose does not explicitly disclose vacuum in the chamber to exacerbate deformation or disbond.

Cielo states that it is known in the art that deformation (defect) of a coating (lamination) layer can be produced by either vacuum (decreased air pressure), vibration or surface heating (col. 1, lines 54-56) in order to evaluate the specimen. Inherently, in order to generate vacuum, one needs to have a vacuum source (vacuum pump).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to produce/ exacerbate deformation of the coating layer of the specimen disclosed by Devitt, Li and Cramer, by reducing the air pressure, as taught by Cielo, so as to evaluate the specimen, already suggested by Cielo, because applying vacuum will make the defect more visible for the user.

It would have also been obvious to one of ordinary skill in the art to add a vacuum pump, as taught by Cielo, to the device disclosed by Devitt, Li and Cramer so as to regulate the

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pressure inside the chamber, so as to produce different level of deformation of the sample and allow the user to estimate the defect while the specimen is being under different stresses.

With respect to claim 6: having a sealed enclosure divided onto two parts, absent any criticality, is only considered to be an obvious modification of shape of the device disclosed by Devitt, Li and Cramer because the courts have held that a change in shape or configuration, without any criticality, is within the level of skill in the art as the particular shape claimed by applicant is nothing more than one of numerous shapes that a person having ordinary skill in the art will find obvious to provide for the sealing chamber disclosed by Rose.

In re Dailey, 149 USPQ 47 (CCPA 1976).

4. Claims 19-22 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devitt, Li, Cramer, Rose and Cielo as applied to claims 1-6, 15-16 and 23 above, and further in view of Thermography and Ultrasonic Finds Flaws in Composites article, 1993 [hereinafter Article].

Devitt, LI, Cramer, Rose and Cielo disclose the device as stated above in paragraphs 2-3. They do not disclose the limitations of claims 19-22 and 24-26.

Article discloses a device comprising a flash lamp as a heater.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the heater disclosed by Devitt, Li, Cramer, Rose and Cielo with a flash lamp, as taught by Article, because both of them are alternate types of heaters which will

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perform the same function of directing light/heat onto the specimen in order to heat the specimen, if one is replaced with the other.

With respect to the particular location of the heater/flash lamp, such as inside or outside the chamber, as stated in claims 22, 25 and 26: It would have been obvious to one of ordinary skill in the art at the time the invention was made to relocate the heater of the device disclosed by Devitt, Li, Cramer, Rose and Cielo inside/outside the chamber, since it has been held that rearranging parts of the invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

With respect to the particular location of the imager such as inside or outside the chamber, as stated in claim 26: It would have been obvious to one of ordinary skill in the art at the time the invention was made to relocate the imager of the device disclosed by Devitt, Li, Cramer, Rose and Cielo inside/outside the chamber, since it has been held that rearranging parts of the invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

5. Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devitt, Li, and Cramer as applied to claims 1, 3, 18 above, and further in view of White et al. [hereinafter White].

Devitt, Li and Cramer disclose the device as stated above in paragraph 2.

They do not disclose a heat lamp as a heater.

White discloses a device comprising a heat lamp (col. 4, line 31).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the heater used by Devitt, Li and Cramer with a heat lamp, as taught by White, because both of these device are alternate types of heaters which will perform the same function of heating the specimen in order to cause a thermal defect, if one is replaced with the other.

With respect to an attachment to apply (couple/conduct) a force to the specimen as stated in claim 27: It is very well known in the art that a media such as an air is considered to be a coupling media/agent (attachment) to transmit (couple) a disturbance such as ultrasound waves to an object (specimen). Therefore, an air path disclosed by Devitt, Li and Cramer between the ultrasound and the specimen, in a broad sense, can be considered a coupling media (attachment).

***Allowable Subject Matter***

6. Claims 7-14 and 17 would be allowable if rewritten to overcome the rejection(s) stated in this Office action and to include all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

7. Applicant's arguments with respect to claims 1-28 have been considered but are moot in view of the new ground(s) of rejection.

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***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the PTO-892 and not mentioned above disclose related devices.
9. Any inquiry concerning this communication should be directed to Examiner Verbitsky whose telephone number is (703) 306-5473.

Any inquiry related to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956.

GKV

September 13, 2001



Diego Gutierrez  
Supervisory Patent Examiner  
Technology Center 2800

## United States Patent [19]

Rose

[11] Patent Number: 5,587,532

[45] Date of Patent: Dec. 24, 1996

## [54] METHOD OF MEASURING CRACK PROPAGATION IN OPAQUE MATERIALS

[75] Inventor: Douglas N. Rose, Macomb County, Mich.

[73] Assignee: The United States of America as represented by the Secretary of the Army, Washington, D.C.

[21] Appl. No.: 371,719

[22] Filed: Jan. 12, 1995

[51] Int. Cl. 6 G01N 29/04

[52] U.S. Cl. 73/579; 73/571

[58] Field of Search 73/571, 587, 606,  
73/643; 250/492.1, 492.2, 492.3; 374/5;  
356/432

[56]

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Primary Examiner—Hezron E. Williams

Assistant Examiner—Christine K. Oda

Attorney, Agent, or Firm—Peter A. Taucher; Gail S. Soderling

[57]

## ABSTRACT

A microscopy-thermal wave microscopy apparatus for measuring crack propagation resistance based on the lateral crack system induced by forming a hardness indentation in an opaque material the resistance and crack extent providing a quantitative measure of the spalling propensity of the opaque material.

1 Claim, 1 Drawing Sheet

